SDP

SMALLHOLDER DAIRY PROJECT

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SDP Policy Brief 10

The Uncertainty of Cattle Numbers in Kenya

Key points

- There are concerns about the reliability of the official cattle figures for Kenya; no recent livestock census has been conducted and the methods used to estimate cattle numbers are imprecise.
- A conservative estimate of the size of the national dairy herd using detailed Smallholder Dairy Project (SDP) survey data suggests that it could be more than twice the officially reported figure of 3 million dairy cattle. These cattle are mostly owned by approximately 2 million rural smallholder farms.
- The apparent discrepancy between cattle population figures and actual numbers on the ground has important implications for estimates of national milk production, marketing and consumption, and for the economic role of the livestock industry in Kenya.
- There is a need for a detailed cattle census to generate accurate information on the actual size of the national herd.
- A cattle population projection methodology used in this study and detailed in an SDP manual can be used by ministry field officers to validate livestock populations and thus enable them to provide more accurate figures.

Introduction

The official cattle population statistics in Kenya come from the Ministry of Livestock and Fisheries Development (MoLFD), through its field reports. The data are compiled by extension officials, who use diverse and sometimes rather imprecise methods to estimate livestock numbers in their assigned areas. Concerns have been expressed as to the reliability of these estimates, particularly as no national cattle census has been carried out to provide base figures. The Smallholder Dairy Project (SDP) has used a variety of statistical methods in an attempt to validate the official cattle numbers in Kenya (box 1). The results indicate that official figures may greatly underestimate the size of the national dairy herd.

Box 1.
Data sources and methods

Validation of the official figures took place in several stages:[1]

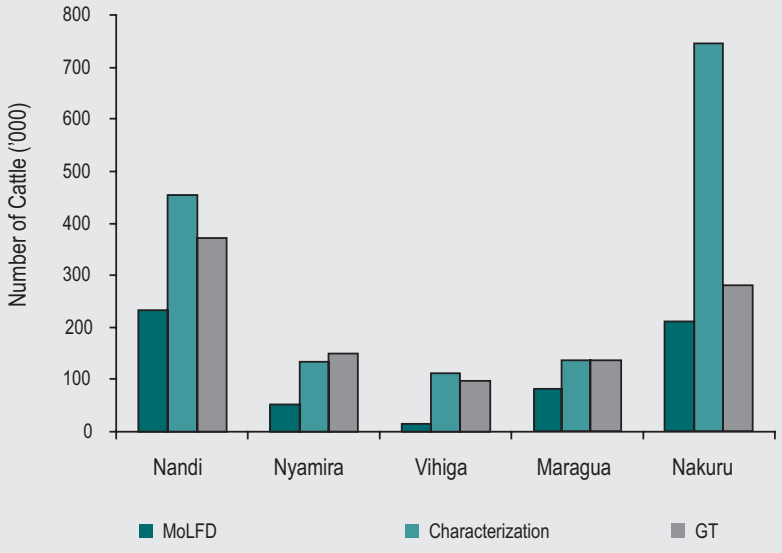
1. Data comparison: Official cattle population figures from 1995–1997 division-level reports were compared with data obtained during SDP farm household surveys conducted during 1997–2001 to characterize the dairy systems in Kenya. These characterization surveys yielded much higher estimates of cattle populations than the official data.

2. 'Ground-truthing' survey of sample farms: A farm survey was conducted to assess the reliability of the official figures using a larger sample of farms. In this cattle population 'ground-truthing' (GT) survey, a random sample of about 1,000 farms was drawn from each of the five study districts in which the SDP characterization surveys took place: Nandi, Nyamira, Vihiga, Maragua and Nakuru.
The numbers of cattle were projected by calculating the product of the total number of farm households in a district, the estimated proportion of farm households owning cattle, and the mean number of cattle in cattle-owning households.

3. Milk availability and consumption survey: The continued disparity between official and SDP estimates of cattle populations was further investigated by projecting, for the five study districts, levels of milk availability (for both official and GT figures) and comparing these with levels of milk consumption. Milk availability was computed using a formula that applied various parameters – proportion of cows in herds, level of milk yields in different breeds – to the cattle population figures. Milk consumption was estimated using data from the SDP characterization surveys.
Further, the balance of availability and consumption indicated by these methods was compared to district-level direction of flow of milk trade (data from SDP characterization surveys).

4. Cattle census: An actual cattle census was also conducted in three sublocations where the GT survey had been conducted, and a comparison made between the actual cattle numbers on the one hand, and GT projections and MoLFD estimates on the other hand.

Figure 1.
Comparison of MoLFD data on dairy cattle numbers and projections based on SDP characterization and GT surveys in five districts.

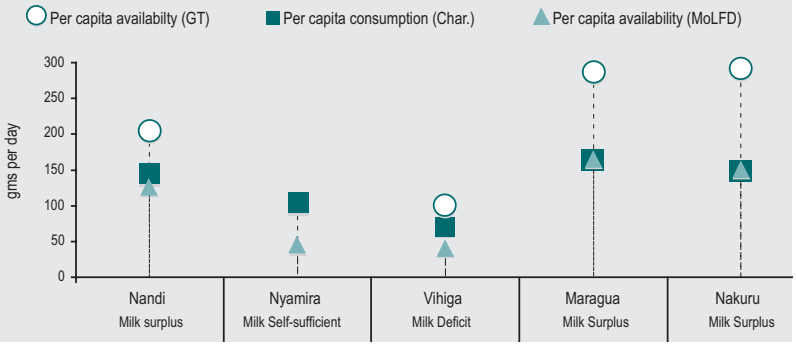


Results

Cattle population 'ground-truthing' (GT) survey

Figure 1 compares the SDP dairy cattle population projections based on the characterization surveys and the GT survey with the official (MoLFD) figures (see box 1 for methodology). The two survey-based sets of dairy cattle populations were at least 60 percent higher than the official figures in all the districts except Nakuru, which suggests that the official figures often understate actual cattle numbers[3]. Also, the close correlation between the pairs of survey figures in all districts (except Nakuru) supports their reliability[4].

Figure 2.
Comparison of per capita milk availability (based on projections of GT and MoLFD data on cattle numbers) and levels of milk consumption in five districts



Milk availability and consumption survey

This survey sought to compare milk availability in the five study districts, assuming either the official (MoLFD) or GT estimates of dairy cattle numbers, with rates of per capita consumption, based on the SDP characterization surveys (see box 1 for methodology). The following points arise from a study of figure 2:

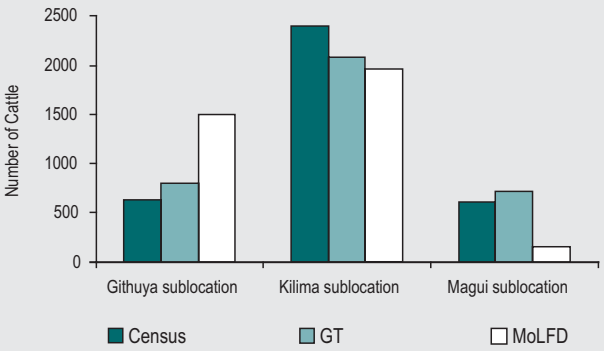
- For Nandi, Maragua and Nakuru, the GT excess of availability over consumption is in keeping with their status as milk surplus areas. The MoLFD figures, however, are lower than expected, indicating self-sufficiency or (in the case of Nandi) deficit.
- For Nyamira, the parity of consumption and GT availability figures is again in keeping with its self-sufficient status, whereas the official figure suggests a deficit.
- For Vihiga, in contrast, the MoLFD figure, showing lower availability than consumption, is more consistent with its status as a milk deficit area.

In four out of five districts, therefore, the GT estimates of dairy cattle numbers are more consistent with observed availability and market characteristics, while official figures are lower than expected and may understate actual numbers.

Actual cattle census in three sublocations

In a further validation exercise, an actual cattle census was undertaken in three sublocations (Githuya, Maragua District; Kilima, Nakuru District; Magui, Vihiga District). Figure 3 compares actual dairy cattle populations from the census with the GT survey projections and official MoLFD figures. In each case the GT projections compare well with actual census figures, indicating that the GT random sampling methodology could, in equivalent circumstances, give reasonably reliable estimations of actual cattle populations.

Figure 3.
Comparison of SDP census data on dairy cattle numbers, GT projections and MoLFD data in three sublocations



National cattle projections and rates of milk availability

An important implication of this study is that there are probably far more cattle in Kenya than is officially reported. Using a methodology whereby rural sublocations in Kenya were clustered into similar groups, and a formula then applied to the estimation of cattle numbers within each cluster, it was projected that there are about 6.7 million dairy cattle (2.7 million high grade and 4 million crosses) owned by 1.8 million rural smallholder farms mainly in the Kenyan Highlands. This projected cattle population is more than twice the officially reported figure of 3 million for the national herd[5].

Based on these projections, total milk production in the rural highlands is estimated at about 4 billion litres per annum. The rural areas have an estimated population of about 14.5 million people. Assuming that the estimated 9.6 million people living in the urban areas mainly depend on milk from the high potential areas, and that 13 percent of production goes to calf feed or spoilage loss, milk availability from the highlands was estimated to be about 145 litres per person per year.

Previously, milk consumption in Central and Rift Valley provinces, which are important milk production areas, has been estimated to be between 144 and 152 litres per person per year[6]. Assuming rough parity between availability and consumption over this large area, these figures provide further confirmation of the applicability of the SDP methodology for estimating cattle populations.

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The Smallholder Dairy Project (SDP) carries out research and development activities to support sustainable improvements to the livelihoods of poor Kenyans through their participation in the dairy sub-sector. SDP is jointly implemented by the Ministry of Livestock and Fisheries Development, the Kenya Agricultural Research Institute, and the International Livestock Research Institute, and is funded by DFID.

Estimating cattle populations: A methodology

In view of the apparent need for a more accurate methodology for estimating cattle populations in Kenya, the SDP has developed a manual outlining a step-by-step procedure for this purpose[7]. The SDP manual for estimating cattle populations is designed for use in the high-potential areas of Kenya, characterized by sedentary mixed farming systems. It presents a simple and inexpensive method by which investigators can use cattle counts from sample farms in selected sublocations to derive cattle population estimates for a much larger area. The manual describes how to select the sample sublocations and cluster them according to agroclimatic conditions, human population density and market accessibility; how to select the sample farms, considering such factors as expected variations in herd size; how to collect the actual data; and how to use the data to estimate cattle populations. It concludes with a worked example. It is hoped that the manual will be of particular use to government officials aiming to collect accurate cattle population statistics as an important tool for decision making.

Conclusions and recommendations

Several conclusions can be drawn from this study:

- Current methods of estimating cattle numbers may be inaccurate and based on inadequate base data.
- Improved methodologies for estimating cattle populations are available.
- A combination of validation methods shows that the actual numbers of dairy cattle and dairy farm households in Kenya may be more than twice what is officially stated.
- This apparent discrepancy has important implications for estimates of national milk production, milk marketing and consumption, which are key indicators of the role of the livestock industry in rural and national development in Kenya.

The following recommendations may therefore be considered:

- There is an urgent need for a detailed cattle census to generate accurate information on the actual national herd size.
- The cattle population projection methodology used in this study can be used by ministry field officers to validate livestock populations and thus enable them to provide more accurate figures.

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1 A full description of the methodology is contained in 'The Kenyan Cattle Population: The Need for Better Methods of Estimation.' SDP Collaborative Research Report (draft), 2005.

2 Based on the 1999 human census survey by the Central Bureau of Statistics.

3 Nakuru is a large district with marked variability in agroclimatic potential and systems of farming. All the diverse regions of the district were not equitably represented during sampling, leading to uncertainty about the reliability of cattle population projections for the district.

4 For zebu (beef) cattle populations, the sets of survey-based figures were also frequently higher than the official figures, and suggested that there are at least 40–50 percent more zebu cattle in three of the five sample districts. The GT and characterization survey estimates compared well in Nandi, Nyamira and Vihiga districts.

5 The size of the zebu cattle population was estimated at about 3.7 million.

6 Estimated per capita milk consumption in other provinces is much lower, mostly ranging between 38 and 54 litres per year.

7 Nyangaga, J., Wanyoike, F., Mwangi, D.M., Wokabi, A., Kembe, M. and Staal, S. 2005. A manual for estimating cattle populations: Designed for the highlands and high potential districts of Kenya. SDP (Smallholder Dairy Project), Nairobi, Kenya, MoLFD (Ministry of Livestock and Fisheries Development), Nairobi, Kenya, KARI (Kenya Agricultural Research Institute), Nairobi, Kenya, DFID (Department for International Development), London, UK, and ILRI (International Livestock Research Institute), Nairobi, Kenya.

This publication is an output from a project funded by the Department for International Development (DFID) of the United Kingdom for the benefit of developing countries. However, the views expressed here are not necessarily those of DFID.

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